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## MECHANICS.

208. **Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, Eng.**

Hanging at rest over a smooth pulley are two equal scale pans of the same mass. Two equal particles, the one inelastic and the other elastic, are simultaneously dropped from the same height one into each scale pan. Show that each impact after the first must occur when the pans have returned to the *status quo ante*, and find the total space described by either pan before motion ceases.

209. **Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, Eng.**

Two particles are projected along planes at angles $\alpha$ and $\frac{1}{2}\pi-\alpha$ to the horizon, the horizontal lines on the two planes being inclined at an angle $\phi$. The initial relative velocity is parallel to a certain plane. Show the relative path is a parabola, and find the inclination of its axis to the vertical.

## NUMBER THEORY AND DIOPHANTINE ANALYSIS.

149. **Proposed by REV. R. D. CARMICHAEL, Anniston, Ala.**

Prove that every prime of the form $4n+1$ may be expressed as the sum of two parts $r$ and $s$ such that $r^2+rs+s^2+1$ is divisible by the prime.

150. **Proposed by H. S. VANDIVER, Bala, Pa.**

Show that for all positive integral values of $n$ except unity, $(2n)!$ is less than $[n(n+1)]^n$. Direct proof preferred. [Unsolved problem in *Educational Times.*]

## AVERAGE AND PROBABILITY.

192. **Proposed by REV. R. D. CARMICHAEL, Anniston, Ala.**

A point is taken at random in a square whose side is $2a$. With this point as center and radius$=a$ a circumference is described. What is the mean area of that part of the circle which lies within the square?

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## BOOKS.

*A Treatise on the Integral Calculus Founded on the Method of Rates.* By William Woolsey Johnson, Professor of Mathematics at the United States Naval Academy, Annapolis, Md. Small 8vo. Cloth, xiv+440 pages, 71 figures. Price, $3.00. New York: John Wiley and Sons.

This volume is an enlargement and an extension of the author's *Elementary Treatise on the Integral Calculus*, a revised edition of which appeared in 1898, and forms a companion volume to his *Treatise on the Differential Calculus*, published in 1904.

The enlargement consists in a fuller treatment of formulae of reduction and of double and triple integrals and the extension, comprising about half of the volume, consists of a chapter (IV) on Mean Values and Probabilities; one (V) on Definite Integrals, including the Eulerian Integrals, Fourier's Series, and Chapter VI on Functions of a Complex Variable. Each section is followed by a large collection of problems with their answers.

This book, together with its companion volume, forms an admirable course for students of the Calculus. F.

*Geometric Exercises for Algebraic Solution.* Second Year Mathematics for Secondary Schools. By George William Myers, Professor of the Teaching of Mathematics and Astronomy, College of Education of The University of Chicago, and William R. Wicks, Ernest A. Wreidt, and Ernest R. Breslech, Instructors in Mathematics in the University High School of The University of Chicago. 8vo. Cloth, ix+71 pages. Price, 75 cents. Chicago: The University of Chicago Press.

The authors of this little volume felt the imperative need of enabling mathematical pupils, during the second year, at least to hold the algebraic ground and fill the gap between the first year algebra and the second year when it is usually dropped to take up geometry, and to this end they prepared this book of exercises. The exercises are so chosen as to cover algebra to and through quadratics, and they will be found exceedingly useful to teachers of either algebra or geometry. F.

*First Year Mathematics for Secondary Schools.* By George William Myers, Professor of the Teaching of Mathematics and Astronomy, College of Education of the University of Chicago, and William R. Wicks, Harris F. MacMeish, Ernest R. Breslich, Ernest A. Wreidt, Instructors in the University High School of The University of Chicago. 8vo. Cloth, xv+189 pages. Price, $1.00. Chicago: The University of Chicago Press.

*First Year Mathematics* is a stage of study of the practical educational problem of inducting beginners in secondary school mathematics into the diversified field of this science, through the agency of a body of unified mathematical material, drawn from algebra, arithmetic, geometry, and from the rudiments of quantitative science. The backbone of the year's work is algebra, into which the material drawn from kindred fields articulates. The book is not a finished text but a distinct step toward a text that shall be adapted to first-year maturity, and in conformity with the modern trend of educational thought.

*A Text-Book in Physics for Secondary Schools.* By William N. Mumper, Ph. D., Professor of Physics in the State Normal and Model Schools of Trenton, New Jersey. 8vo. Cloth, 411 pages. Price, $1.20. New York and Chicago: American Book Co.

This book takes up the study of physical laws where the pupil's knowledge respecting them begins; that is, it begins with the level of the pupil's knowledge. It treats the subjects in a systematic and concise manner. The illustrations are very good and the book is gotten up in splendid form. F.